US Army Corps of Engineers
Waterways Experiment Station

Soil Mechanics Information
SMIAC
Analysis Center

Volume 94-4 August 1994

Earthquake Engineering Research Program

The Earthquake Engineering Research Program is an applied research program established by the U.S. Army Corps of Engineers to provide design procedures and criteria for assuring the seismic safety of many of our nation's dams, locks, and levees. The need for the program was recognized by visionary leaders who realized the life safety risk. More than 200 reservoir dams, for example, are subject to potentially significant seismic shaking and most were built when earthquake engineering was in its infancy. The new 7-year research program is designed to develop and improve procedures to evaluate the seismic hazards, characterize the sites, model the predicted behavior (physically in the centrifuge and numerically), compute the expected damage, and develop cost-effective remedial measures and improved design procedures. The program is divided into geotechnical and structural elements. Geotechnical work units address the steps involved in solving a seismic problem for embankment dams while structures work units address concrete dams and outlet works. The effort is extremely cost-effective. The cost of partial failure of even one facility is estimated to exceed that of the entire research program. Interagency coordination has been pursued by participation in numerous forums, program reviews, and individual communication with the primary contributors to current earthquake engineering research including FEMA, NIST, USGS, NSF, FHWA, USBR, TVA, NCEL and university and international experts. Program manager is Dr. M. E. Hynes of the Earthquake Engineering and Geosciences Division, Geotechnical Laboratory, U. S. Army Engineer Waterways Experiment Station.

In This Issue

A Department of Defense Information Analysis Center

The SMIAC bulletin is published and distributed periodically. Please contact the Director of SMIAC for more information:

Director, Soil Mechanics Information Analysis Center
U.S. Army Engineer Waterways Experiment Station
ATTN: CEWES-GV-Z
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Phone: (601) 634-3376
FAX: (601) 634-3139

Earthquake Engineering

Points of Contact:

Subject Name	*Phone*	*601-634-*
Centrifuge Testing	Mr. Richard Ledbetter	3380
Earthquake Engineering	Dr. Mary Ellen Hynes	2280
Earthquake Instrumentation	Mr. Robert Ballard	2201
Engineering Seismology	Dr. Ellis Krinitzsky	3329
U.S.-Japan Cooperation	Dr. Gus Franklin	2658

You may correspond directly by writing to the following address:

U.S. Army Engineer
Waterways Experiment Station
CEWES-GG
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Seismic Rehabilitation of Earth Dams

An important paper entitled "Seismic Rehabilitation of Earth Dams" was presented at the American Society of Civil Engineers (ASCE) Specialty Conference, Geotechnical Practice in Dam Rehabilitation, at North Carolina State University in April 1993. It presents a number of methods available for engineered rehabilitation of seismically deficient earth dams. Methods include berms and buttresses, replacement of liquefaction-prone material, in-situ densification, in-situ strengthening, and drainage to relieve seismically induced pore water pressure. It includes a survey of completed and active rehabilitation projects. A related article, by the same authors, was published in the ASCE journal, *Civil Engineering*, in December 1993.

U.S.-Japan Cooperation

The Japanese are very active in earthquake engineering research and development. An important forum for the exchange of ideas is the U.S.-Japan Panel on Wind and Seismic Effects. Officials of the Public Works Research Institute, Ministry of Construction, Government of Japan, visited the Waterways Experiment Station (WES) following the 26th Joint Meeting in May. Under the auspices of the U.S.-Japan Cooperative Science Program Agreement, the Corps of Engineers co-sponsored with the Japanese Government a workshop on the remedial treatment of potentially liquefiable soils in Tsukuba, Japan in July. Cooperative future research efforts might involve use of the high-capacity new WES centrifuge scheduled to be operational in 1995.

Partial Listing of Recent Geotechnical Laboratory Publications

Report No.	*Date*	*Title*	*NTIS AD Number*
CR DRP-93-1	08/93	European Dredging Industry Overview with Emphasis on Geotechnical Descriptors	A273186
CR DRP-93-3	10/93	Geotechnical Factors in the Dredgeability of Sediments, Report 3	
TR REMR-GT-16	11/93	Redevelopment of Relief Wells, Upper Wood River Drainage and Levee District, Madison County, Illinois	
TR ITL-93-3	09/93	Soil-Structure Interaction Study of Red River Lock and Dam No. 1 Subjected to Sediment Loading	A270213
TR GL-93-29	11/93	Geophysical Investigation at U.S. Army Materials Technology Laboratory, Massachusetts	A274316
TR GL-94-1	01/94	In Situ Geophysical Investigation of the Pile Test Section, Sardis Dam, Mississippi	A277699
TR GL-94-4	02/94	Site Characterization and Analysis Penetrometer System (SCAPS) Field Investigation at the Sierra Army Depot, California	A277887
TR GL-94-7	03/94	Geomorphological Analysis of North Fork, Toutle River, Washington: 1980-1984	
TR GL-94-8	03/94	Electromagnetic and Magnetic Surveys at Dunn Field Defense Depot, Memphis, Tennessee	A277881
TR GL-94-9	03/94	Earth Resources Stewardship at Department of Defense Installations	A279769
TR GL-94-10	04/94	A Predictive Model to Optimize the Collection of Data Needed to Characterize Fluvial Sand Bodies	A279853
MP GL-94-10	03/94	Seismic Refraction and Electromagnetic Surveys at Fort Detrick, Maryland	
MP GL-94-12	03/94	Legacy Earth Resource Workshop	A279571

The reports listed above having AD numbers can be obtained from: National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161; telephone (703)487-4650. Please refer to the listed AD number. For those reports that do not have AD numbers, the report can be obtained from WES at (601)634-2571.

DTIC Users Conference

The Defense Technical Information Center (DTIC) located at Cameron Station will present its Annual Users Training Conference on 31 October – 3 November 1994. The conference will be held at the Stouffer Concourse Hotel, Arlington, VA, and features the theme "Today's Information Meeting Tomorrow's Challenges." This year's conference will include a variety of speakers and sessions addressing the numerous sources of information available to the Department of Defense community. For further information, contact Ms. Patti Miller at (703) 274-3848 or DSN 284-3848.

The SMIAC Bulletin is published in accordance with AR 25-30 as one of the information exchange functions of the Corps of Engineers. The purpose of the bulletin is to rapidly and widely disseminate information to other Corps offices, U.S. Government agencies, and the engineering community in general. The bulletin does not promulgate Corps policy. The contents of this bulletin are not to be used for advertising or promotional purposes, nor are they to be published without proper credit. Any copyrighted material released to and used in *The SMIAC Bulletin* retains its copyright protection and cannot be reproduced without permission of the copyright holder. *The SMIAC Bulletin* will be issued periodically. Communications are welcomed and should be made by writing to the U.S. Army Engineer Waterways Experiment Station, ATTN: David Haulman (CEWES-GV), 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, or calling (601) 634-3376.

ROBERT W. WHALIN, PhD, PE
Director

OFFICIAL BUSINESS
CEWES-GV-Z

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
3909 HALLS FERRY ROAD
VICKSBURG, MISSISSIPPI 39180-6199

BULK RATE
U.S. POSTAGE PAID
Vicksburg, MS
Permit No. 85